Center for Watershed Protection

Runoff Rundown

Issue 57, October 2014

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Potomac Watershed Jurisdictions Scored on How Well Codes Promote Environmental Site Design

The Center for Watershed Protection and the Potomac Conservancy recently completed a review of development codes for nine Maryland counties located within the Potomac River watershed and the District of Columbia. The purpose of the code review was to identify opportunities and barriers to implementing Environmental Site Design (ESD) practices on development and redevelopment sites. This project is the latest in a series of code reviews led by the Potomac Conservancy to evaluate development regulations for all the Potomac River watershed jurisdictions. Greater implementation of ESD, which reduces hard surfaces and stormwater runoff while conserving natural areas, can help to protect the river and its tributaries from the impacts of polluted runoff while still allowing for growth and new development.

The 14,670 mi^2 Potomac River watershed stretches across parts of Maryland, Pennsylvania, Virginia, West Virginia and the District of Columbia. In this large of a watershed, land use varies greatly from place to place, so the ten jurisdictions were sorted into six categories based on the current level of urbanization and growth pressure. This was done so that each jurisdiction could compare their resulting scores with those of communities with similar characteristics.

Table 1. Classification of Potomac Jurisdictions Included in Code Review

Jurisdiction	Classification
Allegany County	Rural Low Growth
Carroll County	Suburban Vulnerable
Charles County	Suburban Highly Vulnerable
District of Columbia	Built Out w/ Moderate Growth
Frederick County	Suburban Highly Vulnerable
Garrett County	Rural Low Growth
Montgomery County	Urban Moderate Growth
Prince George's County	Urban Moderate Growth
St. Mary's County	Rural Highly Vulnerable
Washington County	Suburban Vulnerable

For each of the ten jurisdictions, the Center reviewed the regulations that govern **how** development happens in the community (as opposed to where or how much). The Center's Code and Ordinance Worksheet (COW) was used as the basis for assessing each jurisdiction's regulations and how they compare to established ESD benchmarks. The COW was first developed in 1998 with input from a national roundtable consisting of municipal staff, environmental groups, the development community and other diverse stakeholders, and the Center has used it in working with over 20 communities since then. All of the Potomac jurisdictions participated in this codes and ordinance review process except for Carroll County because they had reviewed ordinances a few years prior.

In general, the results showed that communities with high growth pressure or with a high percentage of urban land were more prepared than those that were less urban and had low growth pressure. It is likely that these very urban places have faced high growth pressure in the past and have made changes to their development regulations in response to this pressure. This review gives communities that are not so urbanized an opportunity to proactively make changes before they are flooded with an influx of development proposals.

Each of the ten jurisdictions were provided with a report detailing the results of the code review and recommended code changes to remove barriers to ESD and/or more strongly encourage its use. Maryland counties are required to implement ESD to the maximum extent practicable under the Stormwater Management Act of 2007. The most populous counties have stormwater permits that require them to review their codes and remove impediments to ESD one year into their five-year permit cycle. This report can be used as a guide for compliance with these state and federal requirements. Potomac Conservancy is working closely with several of the counties on implementing the code changes.

The final report is available at www.potomac.org/esdscorecard. For more information about this project, contact Amanda John at john@potomac.org or 301-608-1188 ext. 209, or Julie Schneider at jas@cwp.org or 215-277-1655.

Treatment Technologies for Contaminated Construction-Related Discharges

The District of Columbia Department of the Environment (DDOE) is in the process of developing guidance on discharging groundwater from construction site dewatering into the municipal separate storm sewer system or to surface waters. The intent is to ensure that these discharges are in compliance with the District's surface water quality standards.

During the dewatering process, surface water may be contaminated by coming into contact with contaminated soils, or mixing with contaminated groundwater. Alternatively, discharge water may be solely contaminated groundwater. Of particular concern are those sites with prior commercial and/or industrial activities, such as chemical storage, gas stations, laundry sites, power generation, and incineration. Groundwater and/or stormwater at these sites may contain elevated concentrations of metals, volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs) including Polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons, and/or polychlorinated biphenyls (PCBs).

In the District, potentially high groundwater tables increase the chance that construction activities will require dewatering discharges. In addition, most construction activity involves redeveloping sites that were originally built on a low-lying swampy area that was successively filled using a wide variety of "readily available" material. As a result, the need for treatment of contaminated groundwater before discharge is highly likely.

DDOE's permitting procedure requires benchmark monitoring of all potential discharge water in order to:

- determine if a treatment system is needed,
- decide on the appropriate treatment techniques to ensure surface water quality standards are met, and
- determine future monitoring requirements.

The Center for Watershed Protection is assisting DDOE to develop guidance for the permit process and has researched the various technologies available for treatment of contaminated construction related discharges. Nearly all of the discharges from dewatering can use off-the-shelf, economically viable, and proven treatment systems that fall into one of two major treatment categories: 1) chemical treatment or 2) physical treatment. Each of these two general types of treatments can be broken down into elements that can be tailored to the specific pollutants and pollutant concentrations. Common historic treatment techniques for contaminated groundwater are highlighted in Table 1.

Table 1: Applicability of Treatment Technologies to Contaminated Groundwater. Reproduced from USEPA (1991).

	Practices																	
Contaminant	Neutralization	Precipitation	Coprecipitation/Coagulation	UV/Ozone	Chemical Oxidation	Reduction	Distillation	Air Stripping	Steam Stripping	Activated Carbon	Evaporation	Gravity Separation	Flotation	Membrane Separation*	Ion Exchange	Filtration	Biological	Electrochemical
Metals																		
Heavy Metals	X	●	●	X	X	○	X	X	X	○	●	●	X	●	●	●	X	●
Hexavalent chromium	X	●	X	X	X	●	X	X	X	○	●	X	X	○	●	X	X	●
Arsenic	X	○	●	○	○	X	X	X	X	○	X	○	X	●	●	●	X	X
Mercury	X	●	●	X	X	●	X	X	X	●	X	○	X	○	●	●	X	X
Cyanide	X	X	X	●	●	X	X	X	X	X	●	X	X	●	●	X	○	○
Corrosives	●	●	X	X	X	X	○	X	X	X	X	X	X	X	X	X	X	X
Volatile organics	X	X	X	○	●	X	●	●	●	●	X	X	X	○	○	X	○	X
Ketones	X	X	X	○	●	X	●	●	●	X	X	X	X	X	X	X	●	X
Semivolatile organics	X	○	○	●	●	X	●	X	●	●	○	○	○	●	●	X	●	X
Pesticides	X	○	○	●	●	X	●	X	○	●	○	○	○	●	●	●	○	X
PCBs	X	●	●	●	●	X	●	X	X	●	●	●	●	●	●	●	○	X
Dioxins	X	●	●	●	○	X	●	X	X	●	●	●	●	●	●	●	○	X
Oil and grease/floating products	X	●	●	X	X	X	●	X	X	X	●	●	●	●	●	○	○	X

● Applicable
○ Potentially Applicable
X Not Applicable
* Technology includes several processes; reverse osmosis and ultrafiltration among others.

Though this list is comprehensive, not all of these are common in the District. With input from DDOE, a subset of common and relevant technologies were identified to be most applicable in the District based on their proven effectiveness at removing the contaminants most commonly found there (Table 2). Innovative treatment technology an applicant identifies will likely be welcomed as long as the discharge/effluent will meet discharge requirements and surface water quality standards.

Table 2: Contaminants Frequently Identified in Groundwater and Soil in DC and Treatment Technologies Found to Be Effecti

Pollutant	Treatment Options
Total Petroleum Hydrocarbons (TPH) • Diesel Range Organics (DRO) • Gasoline Range Organics (GRO) • BTEX	Pump or excavate and dispose offsite; Phase separation followed by Granulated Activated Carbon Filtration; Multiphase extraction; Air stripping; Chemical Oxidation
Volatile Organic Compounds (VOCs)	Phase separation followed by Granulated Activated Carbon Filtration; Air Stripping; Multiphase extraction
Semi-Volatile Organic Compounds (SVOCs)	Phase separation followed by Granulated Activated Carbon Filtration; Multiphase extraction; Air stripping; Chemical Oxidation
Metals and Inorganics	Coagulation; Filtration; Chemical Oxidation

*Highly dependent on presence of free phase and/or concentration of contaminant in liquid. Phase separation will only be required if free product is present, whereas air stripping will only be required if dissolved concentrations are elevated to the point of blinding the carbon media, rendering the system ineffective. Depending on the contaminant and contaminant concentration, one, two, or all three treatments may be required.

While the treatment technologies identified in this research are by no means new, their application to meet surface water quality standards without attempting to fully remediate historic contamination may be unique. In the District, a more pre-emptive approach is being taken to help ensure that water quality standards are met during the construction process and prevent future contamination. Once finalized, the discharge permit will detail specific steps for compliance including monitoring frequencies and reporting requirements.

For more information about this project, contact Reid Christianson at rdc@cwp.org or 410-461-8323.

Center Staff Profile - Sarah Morrow

Sarah Morrow is joined the Center in October 2014 as the Communications and Marketing Manager, where she works on CWP publications, manages website and social media items, and handles event planning and publicity. A socio-cultural anthropologist, she received her Bachelors of Science in Anthropology and English from Towson University and her Masters of Arts in Gastronomy from Boston University. Over the years, Sarah has worked in marketing, communications, and development within both the non-profit and academic sectors. She's thrilled now to join the CWP staff and support the Center's mission as it continues to grow!